DOCUMENT RESUME

ED 254 198 IR 011 510

TITLE Computer Literacy. Report to the 1983 General Assembly of North Carolina, 1984 Session.
INSTITUTION North Carolina Legislative Research Commission, Raleigh.
PUB DATE Jun 84
NOTE 79p.
PUB TYPE Legal/Legislative/Regulatory Materials (090) -- Viewpoints (120)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS *Community Colleges; *Computer Literacy; Costs; Elementary Secondary Education; Higher Education; *Policy Formation; *Public Schools; State Surveys; *Statewide Planning; *Teacher Education
IDENTIFIERS Computer Uses in Education; North Carolina

ABSTRACT

This final report analyzes computer literacy and the use of computers in the public schools and community colleges of North Carolina, based on testimony from educators and administrators at the university, community college, and public school levels; from organizations concerned about education; and from corporations that produce computer hardware and software. A summary of the committee proceedings covers background, the role of the computer, a Computer Literacy Plan of Action, and an assessment of the costs of implementing this plan. Recommendations propose basic computer awareness instruction for public schools; training in computer awareness for graduates of all teaching colleges as an accreditation requirement; maximum use of public school computer laboratories; and student and teacher computer ethics training. Appendices provide extensive supporting documentation on the state plan for computer utilization in the North Carolina public schools; state microcomputer activity; the state educational software evaluation program; estimated costs for a 3-year phase-in of computer literacy instruction; enrollment in community college computer occupational curricula or curricula using the computer as a tool, and in continuing education and educational television computer courses; and costs of community college computer labs. (LMM)

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LEGISLATIVE RESEARCH COMMISSION

COMPUTER LITERACY

REPORT TO THE 1983 GENERAL ASSEMBLY OF NORTH CAROLINA 1984 SESSION

IR011510

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June 7, 1984

TO THE MEMBERS OF THE 1983 GENERAL ASSEMBLY:

This is the Legislative Research Commission's report to the 1983 General Assembly, Second Regular Session 1984, on computer literacy. This report is made pursuant to Chapter 905 (HB 1142) of the 1983 Session Laws, was prepared by the Legislative Research Commission's Study on Computer Literacy, and is transmitted by the Legislative Research Commission for your consideration.

Respectfully submitted,

Liston B. Ramsey
Speaker of the House

W. Craig Lawing
Senate President Pro Tempore

Cochairmen
Legislative Research Commission

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PREFACE

The North Carolina Legislative Research Commission is an interim study organization of the General Assembly. The Commission is established and governed by North Carolina General Statutes §§120-30.10 through 120-30.18. The Commission is cochaired by the President Pro Tempore of the Senate and the Speaker of the House of Representatives, and the Cochairmen appoint five members from their respective houses. Among the Commission's duties is that of making or causing to be made, upon the direction of the General Assembly, "such studies of and investigations into governmental agencies and institutions and matters of public policy as will aid the General Assembly in performing its duties in the most efficient and effective manner" (G.S. 120-30.17(1)).

At the direction of resolutions enacted or adopted by the 1983 General Assembly, the Legislative Research Commission has undertaken studies of numerous subjects. These studies were grouped into broad categories and each member of the Commission was given responsibility for one category of studies. The Cochairmen of the Legislative Research Commission, under the authority of General Statutes 120-30.10(b) and (c), appointed committees consisting of members of the General Assembly and of the public to conduct the studies. Cochairmen, one from each

house of the General Assembly, were designated for each committee.

The Study of Computer Literacy was authorized by Chapter 905 of the 1983 Session Laws. That act made reference to House Joint Resolution 191 introduced by Representative Berry and others. Copies of Chapter 905 of the 1983 Session Laws and House Joint Resolution 191 may be found in Appendix A of this report.

The Legislative Research Commission placed this Study under the Education Area for which Representative John Church of the Commission is responsible. This Study was assigned to the Committee on Computer Literacy which was cochaired by Representative Bertha M. Holt and Senator Henson P. Barnes. Membership lists of the Legislative Research Commission and of the Study Committee may be found in Appendix B.

COMMITTEE PROCEEDINGS

The Committee on Computer Literacy held three meetings during the course of its study. The first two meetings were held December 9, 1983 and February 17, 1984 in the State Legislative Building in Raleigh. The third meeting was held April 13, 1984 at the Data General Corporation facility in Research Triangle Park. In the course of its deliberations, the Committee heard testimony from educators and administrators at the university, community college and public school levels, from organizations concerned about education and from corporations which produce computer hardware and software. A list of the witnesses who appeared before the Committee may be found in Appendix C.

Background of the Study

The Legislative Research Commission directed the Study of Computer Literacy in response to House Joint Resolution 191 (HJR 191), 1983 Session and Chapter 905, 1983 Session Laws. The preamble to HJR 191 listed several factors which made necessary a study of computer literacy. First of all, it noted that computers are having an impact on every aspect of modern life as evidenced by the fact that "Time" magazine chose the computer as its "Man of the Year". Also, the State's commitment to the Microelectronics Center demonstrates the State's emphasis on microelectronics and computers. The preamble also noted that a computer oriented and trained population could help reduce the

effects of an economic downturn and that the "high-tech" job market could provide jobs for agrarian workers. Finally, the preamble noted that retraining people to be computer literate would not be as effective as training them when they are young in the public schools. The body of HJR 191 went on to call for a study of "'computer literacy'" and the use of computers in the public schools and community colleges of North Carolina." HJR 191 was not adopted by the 1983 General Assembly but was referenced by House Bill 1142 which was enacted by the 1983 General Assembly as Chapter 905. Chapter 905 authorized a long list of studies including the HJR 191.

The Role of Computers in the Schools

Persons appearing before the Committee tended to disagree about what the role of computers should be in the public schools. Some felt that computer instruction is a "basic" or "the fourth 'R'", and that intense computer instruction right now should have the highest priority. At the other end of the spectrum, some cautioned that other educational needs are more pressing, that a focus on computers might detract from rigorous, disciplined learning in the traditional basics and that much of what we are teaching about computers today may soon be made obsolete by technology. Some spoke of the need for "computer literacy"; others wanted the focus to be "computer assisted instruction". Some tried to assist the Committee in defining terms. For example, Dr. Jean Overton, representing the Department of Community Colleges collected for the Committee a half-dozen different

definitions of "computer literacy", all by experts, and then attempted to synthesize them for the Committee.

In spite of the differing perspectives and focuses, there seemed to be some areas of general consensus. First of all, computers have made and will continue to make a significant impact on our society and on the way we do business. Secondly, all students need to interact with computers to some extent as part of their general education. Finally, whether we like it or not, and whether we are ready or not, computers are already in the schools. According to statistics presented by Dr. David Lillie of the University of North Carolina School of Education, there are already 325,000 microcomputers in this country's public schools; furthermore, there are 200% more microcomputers in the schools this year than there were last year. Charts produced by Dr. Lillie graphically demonstrating the proliferation of microcomputers in the schools may be found in Appendix D.

What is Happening in North Carolina -- the Public Schools

As of June 1983, the North Carolina public schools had at least 7,100 microcomputers. Of these, at least 2,488 were held by vocational programs and at least 4,612 were held by media centers. A breakdown of the number of microcomputers owned by each school system as of June 1983 may be found in Appendix E.

North Carolina has a tradition of providing direction to the public schools at the State level while permitting the local school systems a high degree of autonomy in running their schools; computer use in the public schools follows this tradition. The

Department of Public Instruction is currently providing information and advice to the school systems. School systems vary dramatically in their commitments to the use of computers in the schools, in the sophistication of their computer programs and in what they want to achieve with those computers.

A majority effort by the Department of Public Instruction to provide direction to school systems on using computers in the schools is the "State Plan for Computer Utilization in the North Carolina Public Schools". The purpose of the State Plan is to establish a philosophical base for using computers in the schools. A copy of the State Plan may be found in Appendix F.

The State Plan defines computer literacy as "knowing how to use a computer for personal applications and how to recognize other potential uses for the machine". It recognizes that school systems will particularize computer literacy programs to meet their individual needs, but it sets out the following as the core of any computer literacy program:

"...activities to overcome negative attitudes or fears
...definitions of computer terms
...familiarity with basic components of a microcomputer
...what a computer and computer programs can and cannot do
...an introduction to computer programming
...sources of information about computers and computer software
...impact of computers on society"

The State Plan recommends that school systems formulate a local plan based on local goals before they buy any hardware or

software. It further recommends that they establish a local committee to assure adherence to the local plan. School systems have followed the State Plan to varying degrees. While some school systems have done little or no planning and have approached educational computing in a piecemeal fashion, over 20% of them have formulated local plans. A few have done extensive planning and coordinating over several years.

The Durham County Schools, for example, started putting computers in the schools 13 years ago. They currently support 85 terminals and two time-sharing systems and 30 to 40 microcomputers at the high school level. They have 200 additional computers at the elementary school level. Durham County's goals over the next few years are:

(1) To provide 3.5 hours/month/student to at least 60% of all secondary students;

(2) To give students interested in computing as a subject more computer time;

(3) To provide computers as classroom support; and

(4) To provide computers for administrative purposes.

Durham County is spending $300,000 on computers in the schools this year and plans to spend $400,000 next year.

In addition to the State Plan, the Department of Public Instruction provides other assistance to local school systems in implementing computer programs. Services provided include workshops for personnel, a newsletter on recent developments in the field, a database of where to get computer related services and training and where to find the experts, and television

programs for staff development. A summary of these services, compiled by the Department may be found in Appendix G.

One of the most significant services provided by the Department, and one which has received nationwide acclaim, is computer courseware evaluation. A major dilemma facing educators is what software to buy. The Department has reviewed nearly 700 courseware packages. It makes available an advisory list and a review of software most appropriate for use in grades K-12. A laudatory review of this service which appeared in "Electronic Learning" magazine may be found in Appendix H.

The Department of Public Instruction's Assessment of the Cost of Implementing its Computer Literacy Plan of Action

In response to a request from the Committee, the Department of Public Instruction excised from its "State Plan for Computer Utilization" a "Computer Literacy Plan of Action". The Department then analyzed the costs of implementing this Plan of Action.

The Plan of Action's goals and implementation plan are as follows:

"Goals:

...to provide all students the opportunity to become familiar with the operation of a computer, to develop an awareness of the extensive use of computers in the world around them, and to acquire an understanding of the capabilities and limitations of computers.

...to provide an integrated sequence of studies which

incorporates computer awareness (grades K-5), computer exploration (grades 6-9), and computer specialization (grades 10-12), as students progress toward computer literacy.

...to develop a cadre of qualified teaching personnel competent in computer operations, software evaluation and selection, integration of computer software into instructional program, and simple computer programming."

The Department's implementation plan would provide each student 30 minutes of computer access time per week. That would require 20,000 computers or one computer per every 50 students. It would also provide basic computer literacy courseware, minimum maintenance service and staff development for teaching personnel. The total cost of implementation would be $26,804,200 or $8,968,400 per year for three years. An itemized breakdown of these cost figures may be found in Appendix I.

The Committee requested additional cost figures on implementing the Department's plan by phasing it in by grade levels. A phase-in beginning with high school students would assure that all students in the North Carolina public schools would have some computer literacy training before they graduate. The total of this type of phase-in over a three-year period would be $28,516,574. Costs in the first year for grades 9-12 would be $8,828,212, costs in the second year for grades 4-8 would be $11,146,081 and costs in the third year for grades K-3 would be $8,542,281. An itemized breakdown of these cost figures may also be found in Appendix I.

What is Happening in North Carolina -- the Community Colleges

With the proliferation of computers in the home and in the workplace, computers have become an integral part of the community colleges' educational program. Some community college curriculums focus almost exclusively on computers, some treat computers as a major tool or component and some have been revised to reflect the use of computers in on-the-job tasks.

Curriculums focusing almost exclusively on computers, that is curriculums designed to train individuals to program, operate or service the computer, include computer engineering, computer operations and business computer programming. A list of these programs and the 1982-83 enrollment may be found in Appendix J.

Curriculums that treat the computer as a major tool or component train people to work in the manufacturing, electronics or engineering fields. An example of these is the machinist curriculum which now uses computer numerical control instead of operator calculated numerical control. Some other curriculums which are changing to a lesser degree because of computers are the civil engineering technician and architectural technician curriculums which use the computer for computer-assisted drafting, the hotel and restaurant management curriculum which uses the computer to maintain inventories, plan menus, calculate budgets and maintain records and even agricultural scientists who use a computer to plot cattle breeding. A chart listing some of these curriculums and their 1982-83 enrollment may also be found in Appendix J.

Computer courses are also being offered by the continuing education departments and by educational television. These courses tend to teach what a computer is and how it works. They do not prepare people to be computer programmers. Charts listing some of these courses and indicating the number of people enrolled in them between 1980 and 1983 may also be found in Appendix J.

The Department of Community Colleges' Assessment of Some Computer Needs and the Cost of Meeting Them

In response to a request from the Committee, the Department of Community Colleges assessed the demand for computer literacy in the community college system at this time and the cost of meeting that demand.

Based on a recent study conducted in the community college system, the Department made three recommendations affecting continuing education departments. These were:

"1. Courses should be offered in the community college system in curriculum and continuing education to help present and potential employees to be more productive using microcomputers.

2. The continuing education departments in the community college system should consider offering workshops and seminars for interested microcomputer "enthusiasts" in the community.

3. The Department of Community Colleges recommends that

> the colleges place the purchase of microcomputers on a high priority to ensure that the colleges are adequately equipped to provide computer literacy training."

The Department proposed the establishment of at least one computer laboratory for computer literacy instruction in the continuing education departments to meet the growing demand for computer literacy. Each laboratory would have 20 work stations. Costs of the laboratories would depend on which microcomputer is selected. Representative cost analyses for various brands may be found in Appendix K.

RECOMMENDATIONS

Pursuant to the direction of Chapter 905 of the 1983 Session Laws, the Legislative Research Commission's Committee on Computer Literacy, after having reviewed the information presented, makes the following recommendations to the 1983 General Assembly:

RECOMMENDATION 1: BASIC COMPUTER AWARENESS INSTRUCTION SHOULD BE PROVIDED AT ALL LEVELS OF THE PUBLIC SCHOOLS. WE SHOULD NOT WAIT FOR MORE STUDY OR FOR TEACHER TRAINING BEFORE IMPLEMENTING BASIC COMPUTER AWARENESS INSTRUCTION. WE SHOULD BEGIN IMMEDIATELY AND PHASE IT IN OVER A TWO-YEAR PERIOD, BEGINNING WITH GRADES 7-12 IN THE FIRST YEAR. BASIC COMPUTER AWARENESS INSTRUCTION SHOULD BE FUNDED BY THE STATE BUT EACH SCHOOL SYSTEM SHOULD DECIDE THE MANNER IN WHICH IT IS IMPLEMENTED (I.E., -- A NINE-WEEK SESSION, 30 MINUTES PER WEEK, ETC.). SCHOOL SYSTEMS SHOULD BE ACCOUNTABLE TO THE STATE THAT EVERY STUDENT ACQUIRE BASIC COMPUTER AWARENESS BEFORE GRADUATION.

The impact that computers have had and will continue to have on our society, the job market and the way we do business makes it imperative that our students graduate from high school with a basic computer awareness competency. If our students are to function in this era of high technology, they must know something about computers and they must have more experience interacting with computers. Without this training and experience, they may find it difficult to use a computer as a tool when the need arises (and the need is likely to arise for them) and they may even experience the "computer phobia" common to so many of their elders. Testimony before the Committee made it clear that all students do not need higher level programming skills and that using computers in classrooms will not answer all of education's

ills; testimony made it equally clear that if we did not provide a base level of computer awareness, we would be handicapping our students.

The time to implement basic computer awareness instruction is now. Although educators cannot tell us the optimal way to do this and although teachers are not yet fully trained, computer awareness is too important to be deferred. North Carolina needs to act now to assure that local school systems have the resources they need to provide, with direction and assistance at the State level, for basic computer awareness instruction for all students.

Computer awareness instruction should be phased in over a two-year period beginning with grades 7-12 in the first year. Limitations on resources make it impossible to implement computer awareness instruction at all levels of the public schools in a single year. The need is too pressing, however, to spread the implementation over more than two years. Likewise, the need that all students receive some computer awareness instruction before graduation is so pressing that the implementation schedule should cover high school students first. An excellent computer awareness program in place after years of more study, or one beginning with the kindergarten level in the first year, would shortchange all those graduating seniors between now and the time a program was in place at the high school level.

The State has an obligation to provide funding for basic computer awareness instruction. Some school systems have been providing computer awareness instruction for a number of years and will continue to do so. Others have not committed the

resources to computer instruction to any significant degree and are not likely to do so. If the State does not provide funding for computer awareness instruction this difference in the educational opportunities faced by students in the different systems will be perpetuated. Students in poorer and less progressive systems will continue to fall behind their contemporaries in other school systems.

The Department of Public Instruction estimates it would cost $28,426,910 to phase in basic computer awareness instruction in the public schools over a two year period--$13,543,820 in the first year and $14,883,090 in the second year. An itemized breakdown of these cost figures may be found in Appendix L.

North Carolina's long tradition of permitting local school systems wide latitude in setting educational practices should be continued with respect to computer awareness instruction. They should, however, be accountable to the State that the job gets done. The school systems should be permitted to determine how to best implement computer awareness instruction in their educational framework. Some may choose a nine-week session, others 30 minutes per student per week. The differing experiences of different school systems will become a valuable resource for future refinement of local approaches. The State Board of Education should review each school system's plan to assure that, however it particularizes the plan to meet its local circumstances, its students are receiving basic computer awareness instruction prior to graduation.

RECOMMENDATION 2: TO ASSURE THAT SCHOOLS OF EDUCATION PROVIDE AN APPROPRIATE LEVEL OF TRAINING

IN COMPUTER AWARENESS TO PROSPECTIVE TEACHERS, THE COMMITTEE URGES THE STATE BOARD OF EDUCATION TO MAKE SUCH TRAINING FOR ALL GRADUATES A REQUIREMENT FOR ACCREDITATION OF TEACHING COLLEGES.

A major obstacle to making students computer literate is that, for the most part, their teachers are not computer literate. It is much easier to place computers and appropriate software in a classroom than to find teachers able to use them effectively with a class. Many teachers teaching today, like much of the rest of the population, have little facility with computers and feel an ambivalence about computers, in the classroom and otherwise. (Teachers with extensive background and experience with computers are tempted by more lucrative job offers to leave the classroom.) Ideally, teachers should have sufficient training in educational computing to use computers effectively in classrooms and to serve as role models for students on the use of computers as tools.

The State educational agencies, local boards of education and individual teachers are involved in inservice training efforts to train teachers to use computers in the classrooms. The Division of Media Evaluation Services of the Department of Public Instruction, for example, is developing a database of resource people and of colleges providing computer-related services and training for educators. Also, it is holding microcomputer training workshops for school administrators. Summer workshops for teachers are available at the North Carolina School of Science and Mathematics and elsewhere. Inservice training is

taking place and is essential to computer literacy training in the short run.

In the long run, teachers should receive an appropriate level of computer awareness during their pre-service training at the university schools of education. As the following statistics presented to the Committee by Professor David Lillie of the University of North Carolina Department of Education indicate, this is not consistently the case at the constituent institutions of the University of North Carolina or elsewhere.

"--- In a January 1983 telephone survey of 13 of of the 14 constituent members of the Special Education Cooperative Planning Consortium of the University of North Carolina system, Helsel-DeWert, Grube, and Lyon (1983) found that 7 of the 13 schools of education offered no coursework in educational computing. Four offered 1 or 2 courses and two of the schools reported 3 or more such courses.

--- In a recent survey of the nation's 50 state education agencies, Christen and Gladstone (1983) reported that only six states require computer literacy training for their preservice and inservice teachers.

--- In an unpublished survey of approximately 500 teacher training institutions, Gerbach (1982) reported that only 160 (32%) offered some kind of formal coursework in educational computing.

--- In a 1981 survey of 20 of the nation's largest schools of education conducted by Electronic Learning magazine, only one of the institutions (Illinois State University) had a computer literacy requirement for graduation. When the same schools were surveyed in 1982, 9 of the 20 had, or planned to have by the fall of 1983, such a requirement. All of the schools were involved in some form of inservice training (e.g., night time, weekend, or summer seminars and/or workshops)."

For the foregoing reasons, the Committee urges the State Board of Education to make an appropriate level of training in computer awareness for all graduates a requirement for accreditation of teaching colleges.

RECOMMENDATION 3: COMPUTER LABORATORIES IN THE PUBLIC SCHOOLS SHOULD BE USED TO THE MAXIMUM EXTENT POSSIBLE. THEY SHOULD BE MADE AVAILABLE TO THE COMMUNITY COLLEGES AT NIGHT OR DURING THE SUMMER IF THEY ARE NOT OTHERWISE BEING USED BY THE PUBLIC SCHOOLS.

Computer laboratories are too expensive and the demand for community college computer instruction is too great to permit the public schools' computer laboratories to sit idle. The Department of Community Colleges recommended to the Committee that every community college have at least one computer laboratory to meet the growing demand for computer literacy

training by the continuing education departments. This demand ought to be met, to the maximum extent possible, with hardware and software already in place in the public schools.

RECOMMENDATION 4: COMPUTER ETHICS SHOULD BE A PART OF THE TRAINING OF TEACHERS AND STUDENTS.

Although "computer ethics" is not intrinsically different than other ethics, computers offer computer users unique temptations and opportunities to behave unethically. Newspaper accounts, television shows, movies and so forth indicate that some computer users engage in, condone, and even glorify unethical behavior. It should be made clear to teachers and students that copying software or information via computer without permission is wrong for the same reasons that copying someone else's work product by any other means is wrong. It also is a violation of law. Snooping or tampering with someone else's files via computer is also wrong for the same reasons that snooping or tampering with someone else's property any other means is wrong. Again, it is a violation of law. A copy of the North Carolina law on computer-related crime may be found in Appendix M.

Computer instructors should, by example and otherwise, make computer ethics part of the training of both teachers and students.

APPENDIX A

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GENERAL ASSEMBLY OF NORTH CAROLINA

SESSION 1983

H

HOUSE JOINT RESOLUTION 191
Second Edition Engrossed 3/10/83

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Sponsors: Representatives Berry; Gist, Hauser, Jeralds.

Referred to: Rules.

February 14, 1983

A JOINT RESOLUTION AUTHORIZING THE LEGISLATIVE RESEARCH COMMISSION TO STUDY THE TEACHING OF COMPUTER LITERACY IN THE PUBLIC SCHOOLS AND COMMUNITY COLLEGES.

Whereas, Time Magazine has chosen the computer as its "Man of the Year" indicating the impact these machines are having on every aspect of modern life; and

Whereas, the Governor, through his support of the North Carolina Microelectronics Center, is demonstrating the increased emphasis this State is placing on microelectronics and computers; and

Whereas, a study of Japan's economy shows that a computer oriented and trained population can help reduce the effects of an economic downturn such as the one currently depressing heavy industry; and

Whereas, the North Carolina economy is shifting, and will continue to shift from agrarian to technological and those people who would have found jobs on the farms will have to be trained to work in "high-tech" industries; and

Whereas, early and frequent exposure to computers

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creates a "computer literacy" which is hard to match through the retraining of people who have not been exposed to computers during their elementary and secondary educations;

Now, therefore, be it resolved by the House of Representatives, the Senate concurring:

Section 1. The Legislative Research Commission [H-~~XXXX~~][H-may] study "computer literacy" and the use of computers in the public schools and community colleges of North Carolina. The Commission [H-~~XXXX~~][H-may] consider, among other questions, the present use of computers in grades kindergarten through 12, and in the Community Colleges and Technical Institutes; the needs for further computer oriented instruction through the year 2000; the possibility of requiring that each student interact with a computer, in some way, each day; and other ways of increasing students' "computer literacy".

Sec. 2. The Commission may make an interim report to the [H-~~XXXX~~][H-1983] Session of the General Assembly and [H-~~XXXX~~][H-may] make a final report including appropriate legislation to the 1985 Session of the General Assembly.

Sec. 3. This resolution is effective upon ratification.

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(15) Health Professionals (H.J.R. 1194 - Diamont),
(16) Water Quality in Haw River and B. Everett Jordan Reservoir (H.J.R. 1257 - Hackney),
(17) Regulation of Alcoholic Beverages on State Property (H.J.R. 1292 - Clark),
(18) Disposition of Animals by Animal Shelters and Pounds (H.J.R. 1309 - Stamey),
(19) Boards, Commissions, and Councils in the Executive Branch (H.J.R. 1321 - Hunt),
(20) Feasibility of a Food Distribution Facility on Dix Farm Property in Raleigh (H.J.R. 1334 - James),
(21) Implementation of Identification and Labelling of Toxic or Hazardous Substances as Proposed by House Bill 1339 (Payne),
(22) Water Resources Issues Involving North Carolina and Virginia (H.J.R. 1404 - Church),
(23) Investment Guidelines for Eleemosynary Institutions and Funds (H.J.R. 1423 - Musselwhite),
(24) Child Support Collection Procedures (H.J.R. 1439 - Easterling; S.J.R. 675 - Woodard, W.),
(25) Contamination of Unpackaged Foods (H.J.R. 1441 - Stamey),
(26) Legislative Communications Confidentiality (H.R. 1461 - Miller),
(27) Continuation of the Study of Information Processing Resources in State Government (S.J.R. 44 - Alford),
(28) Regulation and Taxation of Banks, Savings and Loans and Credit Unions (S.J.R. 381 - Edwards of Caldwell),
(29) District Attorney Standards (S.B. 496 - Hipps),
(30) Cost of Providing Attorneys and Guardians Ad Litem to Indigents (S.J.R. 643 - Swain),
(31) Public Health Facility Laws (S.J.R. 656 - Hancock), and Review of Certificate of Need Procedures (H.J.R. 1294 - Economos),
(32) Life Care Arrangements (S.J.R. 657 - Hancock),
(33) Worthless Checks (S.J.R. 661 - Thomas of Henderson),
(34) State-owned Rental Housing as contained in Section 2 of this act,
(35) User Fees at State-owned Facilities, as contained in Section 3 of this act,
(36) Motorboat Titles and Liability Insurance, as contained in Section 4 of this act,
(37) Motor Vehicle Inspection Program, as contained in Section 5 of this act,
(38) Continuation of the Study of Day Care (H.J.R. 594 - Colton),
(39) Continuation of the Study on Twelfth Grade (H.J.R. 753 - Manney; S.J.R. 343 - Tally),
(40) Procedure for Incorporating Municipalities (S.J.R. 445 - J. Edwards),
(41) Solar Law (S.J.R. 670 - Walker),

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GENERAL ASSEMBLY OF NORTH CAROLINA
SESSION 1983
RATIFIED BILL

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CHAPTER 905
HOUSE BILL 1142

AN ACT AUTHORIZING STUDIES BY THE LEGISLATIVE RESEARCH COMMISSION AND BY THE COMMISSION ON CHILDREN WITH SPECIAL NEEDS AND MAKING TECHNICAL AMENDMENTS RELATING THERETO.

The General Assembly of North Carolina enacts:

Section 1. The Legislative Research Commission may study the topics listed below. Listed with each topic is the 1983 bill or resolution that originally proposed the study and the name of the sponsor. The Commission may consider the original bill or resolution in determining the nature, scope and aspects of the study. The topics are:

(1) Continuation of the Study of Revenue Laws (H.J.R. 16 - Lilley); and the ramifications, if enacted, of H.B. 746, Appraisal of Subdivided Tract (Auman) and H.B. 1250, No Intangible Tax/Income Surtax (Auman),

(2) Continuation of the Study on the Problems of the Aging (H.J.R. 44 - Economos; S.J.R. 16 - Gray),

(3) Continuation of the Study on Insurance Regulation (H.B. 63 - Seymour) and Insurance Laws and Regulation of Insurance Industry (H.B. 1243 - Hightower),

(4) Teaching of Computer Literacy in the Public Schools and Community Colleges (H.J.R. 191 - Berry) and the Continuation of Study of College Science Equipment (H.J.R. 898 - Enloe),

(5) Adequacy of State Management of Large-Scale Land Clearing and Peat Mining (H.J.R. 220 - Evans),

(6) Adequacy of Existing Water Pollution Control Programs to Improve and Protect Water Quality in the State (H.J.R. 232 - Evans),

(7) Marketing of Seafood by Fishermen (H.J.R. 896 - Chapin),

(8) Continuation of Study on the Economic Social and Legal Problems and Needs of Women (H.J.R. 904 - Easterling; S.J.R. 329 - Marvin),

(9) Regulation of Nonpublic and Public Post-Secondary Educational Institutions (Joint Resolution 33 (H.J.R. 988 - Thomas)),

(10) Readable Insurance Policies (H.B. 1069 - Ballance),

(11) State Government Risk Management (H.J.R. 1083 - Seymour),

(12) Biotechnology Development (H.B. 1122 - Etheridge, Bobby and H.J.R. 1282 - Etheridge, Bobby; S.J.R. 620 - Hancock),

(13) Continuation of Study of the State's Interest in Railroad Property (H.B. 1142 - Hunt),

(14) Restricting Driving by Minors (H.J.R. 1149 - J. Jordan),

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(42) Statutory Liens (S.J.R. 680 - Edwards of Caldwell),

(43) In-service Training of Teachers in North Carolina History, the American Economic System, Free Enterprise Concepts, and Legal Topics (H.B. 1281 - Foster).

Sec. 2. State-owned Rental Housing. (a) The Legislative Research Commission is authorized to conduct a study of all State-owned rental housing during the 1983-84 fiscal year and to recommend a comprehensive statewide rental policy, to be administered by the Department of Administration, to the 1984 Session of the General Assembly. This study shall be conducted in consultation with the department that owns the housing. In conducting this study, the Commission shall first determine the amount of nonessential rental housing currently owned by the State using the following criteria: The geographic location of the State property on which the housing is located and its proximity to alternative privately owned housing; the amount of time that would be required for employees to arrive at the State property on which housing is now located in the event of an emergency; the amount of security necessary for State property that is now being provided by State employees living in State-owned rental housing; and any other benefits to the State for employees to occupy said housing: The Commission shall recommend the disposition of nonessential rental property by one of three means: sale of the housing and property on which it is located; sale of the housing unit only with the stipulation that the house be removed from State property; and conversion of the housing unit to an alternative use.

(b) It is the policy of the State of North Carolina that the State provide rental housing only in cases in which an essential State purpose is served. Nothing in these sections shall be construed to mean that State departments may not continue to divest themselves of nonessential rental housing during the course of the Legislative Research Commission study.

Sec. 3. User Fees. The Legislative Research Commission is authorized to study the potential for user charges and admission fees at State-owned cultural, recreational and historical facilities. The study may cover museums, historic sites, marine resource centers as well as other facilities. The Legislative Research Commission may make an interim report to the 1984 Regular Session of the 1983 General Assembly and may make a final report to the 1985 General Assembly.

Sec. 4. Motorboat Titles and Liability Insurance. The Legislative Research Commission of the General Assembly is authorized to study the issue of motorboat titles and liability insurance. The study may include start-up and administrative costs, potential revenues, phase-in plans, financial institution requirements, etc. The Commission may report to the 1984 Session.

Sec. 5. Motor Vehicle Inspection Program Study. The Legislative Research Commission may study the effectiveness of the motor vehicle inspection program required by Article 3A of Chapter 20 of the General Statutes. The study may consider, among other aspects, the impact on highway safety, cost

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effectiveness of the program, and probable impact of eliminating part or all of the program.

Sec. 6. For each of the topics the Legislative Research Commission decides to study, the Commission may report its findings, together with any recommended legislation, to the 1984 Session of the General Assembly or to the 1985 General Assembly, or the Commission may make an interim report to the 1984 Session and a final report to the 1985 General Assembly.

Sec. 7. G.S. 120-30.17 is amended by adding two new subsections to read:

"(7) to obtain information and data from all State officers, agents, agencies and departments, while in discharge of its duty, pursuant to the provisions of G.S. 120-19 as if it were a committee of the General Assembly.

(8) to call witnesses and compel testimony relevant to any matter properly before the Commission or any of its committees. The provisions of G.S. 120-19.1 through G.S. 120-19.4 shall apply to the proceedings of the Commission and its committees as if each were a joint committee of the General Assembly. In addition to the other signatures required for the issuance of a subpoena under this subsection, the subpoena shall also be signed by the members of the Commission or of its committee who vote for the issuance of the subpoena."

Sec. 8. Section 1 of Chapter 1372, Session Laws of 1981, is amended by deleting "as authorized in Section 2 of Resolution 61, Session Laws of 1981".

Sec. 9. Section 1(3) of Chapter 1372, Session Laws of 1981, is amended by deleting "1983 Session", and inserting in lieu thereof "1983 and 1985 Sessions".

Sec. 10. G.S. 124-5 is amended by deleting "June 1, 1983", and inserting in lieu thereof "the date of convening of the 1985 Regular Session of the General Assembly".

Sec. 11. The last sentence of G.S. 124-5 is amended by deleting "11-month period", and inserting in lieu thereof "period ending on convening of the 1985 Regular Session."

Sec. 12. Deaf/Blind School Move--Commission on Children with Special Needs. (a) The Commission on Children with Special Needs, established by Article 12 of Chapter 120 of the General Statutes, may study the issue of transferring the State schools for the Deaf and the Governor Morehead School for the Blind to the jurisdiction of the State Board of Education.

(b) The Commission may make a final report to the Second Session of the 1983 General Assembly. (H.J.R. 246 - Penner)

Sec. 13. Bills and Resolution References. The listing of the original bill or resolution in this act is for references purposes only and shall not be deemed to have incorporated by reference any of the substantive provisions contained in the original bill or resolution.

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Sec. 14. This act is effective upon ratification.
In the General Assembly read three times and ratified, this the 21st day of July, 1983.

JAMES C. GREEN

James C. Green
President of the Senate

LISTON B. RAMSEY

Liston B. Ramsey
Speaker of the House of Representatives

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APPENDIX B

APPENDIX B

LEGISLATIVE RESEARCH COMMISSION

House Speaker Liston B. Ramsey, Cochairman	Senate President Pro Tempore, W. Craig Lawing, Cochaiman
Representative Chris S. Barker	Senator William N. Martin
Representative John T. Church	Senator Helen Rhyne Marvin
Representative Bruce Ethridge	Senator William Staton
Representative John J. Hunt	Senator R. P. Thomas
Representative Margaret Tennille	Senator Russell Walker

LEGISLATIVE RESEARCH COMMISSION
COMMITTEE ON COMPUTER LITERACY

Representative John T. Church, LRC Member

Representative Bertha M. Holt, Cochairman

Senator Henson P. Barnes, Cochairman

Representative Phillip O. Berry

Representative N. J. Crawford

Senator Robert M. Davis, Sr.

Representative Jeanne Fenner

Senator Charles W. Hipps

Representative Martin Lancaster

Senator William N. Martin

Senator Kenneth C. Royall, Jr.

APPENDIX C

WITNESSES WHO APPEARED BEFORE THE COMMITTEE

Dr. David Lillie
Professor of Education
UNC-Chapel Hill

Ms. Sheila Cary
Coordinator of Computer Programs,
Chapel Hill - Carrboro Schools

Mr. Victor V. Langston
Principal
Wake County's Millbrook High School

Dr. Jean Overton
Program Coordinator for Business Occupations
Department of Community Colleges

Mrs. Elsie Brumback
Assistant State Superintendent for Educational,
Media and Technology Services
Department of Public Instruction

Dr. Steve Davis
Head of Department of Mathematics and Computer Science
North Carolina School of Science and Mathematics

Mr. David Green
Manager of Computing Services
Durham County Schools

Mr. Gene Causby
Executive Director
North Carolina School Boards Association

Mr. Bernard Allen
North Carolina Association of Educators

Mr. Edmund Burke, Director
Research Triangle Park Laboratory
Data General

Mr. Holt Anderson
Microelectronics Center of North Carolina

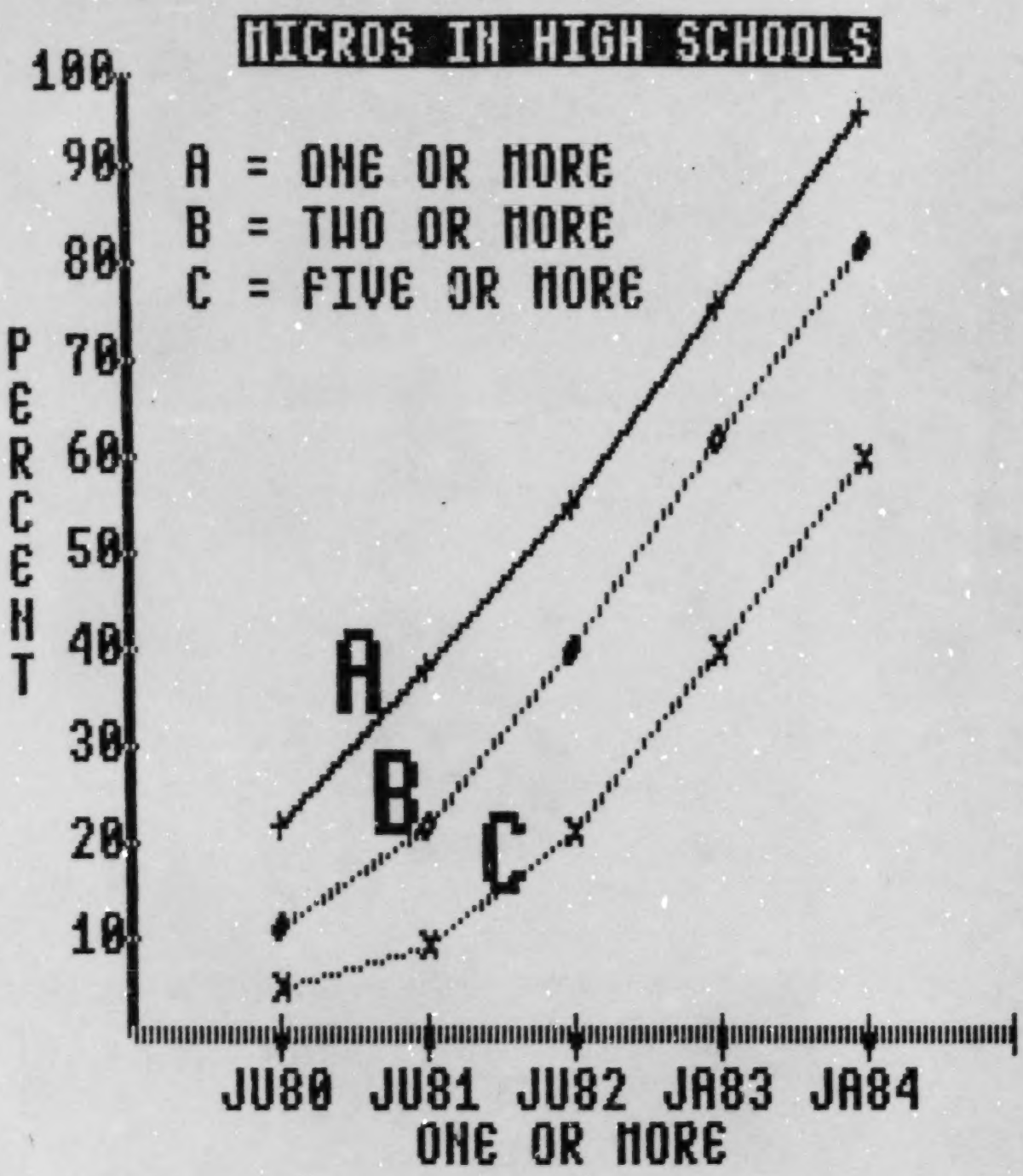
Mr. Howard Mills
State Education Advisor
IBM

Ms. Ricki Grantmyer
Parent Teachers Association

Mr. Joe Haehnn
Commission on Education for Economic Growth

Dr. Art Padilla
Associate Vice President for Academic Affairs
University of North Carolina

Mr. Louis Parker, Director
Educational Computing Service



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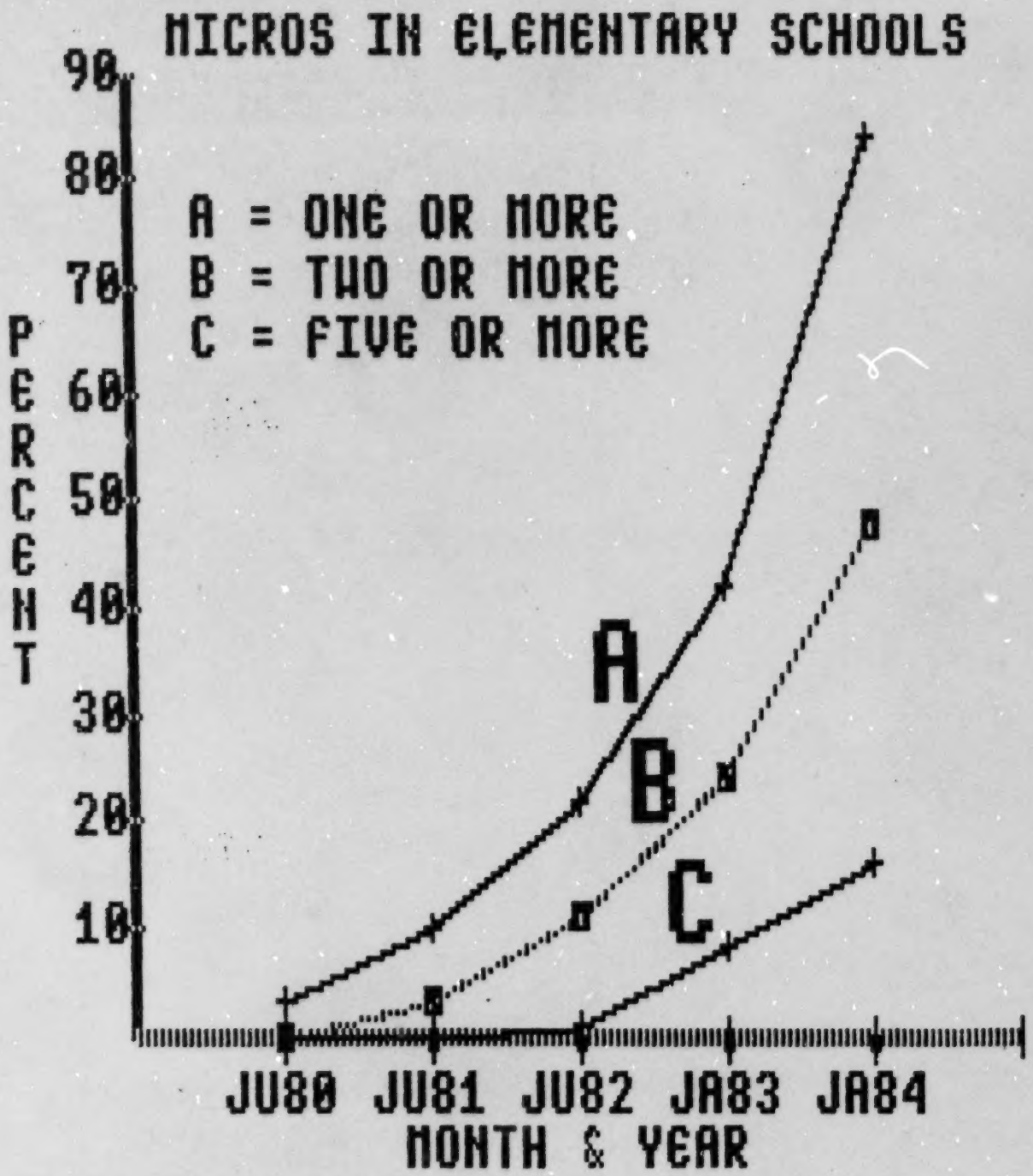

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MICROCOMPUTER STATISTICAL DATA
June, 1983

LEA	MEDIA CENTER HOLDINGS	VOCATIONAL HOLDINGS
ALAMANCE	58	12
BURLINGTON	49	Not Available
ALEXANDER	34	7
ALLEGHANY	6	3
ANSON	25	16
ASHE	1	11
AVERY	13	3
BEAUFORT	7	8
WASHINGTON	18	28
BERTIE	35	30
BLADEN	22	6
BRUNSWICK	12	10
BUNCOMBE	100	30
ASHEVILLE	7	2
BURKE	50	58
CABARRUS	38	12
CONCORD	14	
KANNAPOLIS	46	13
CALDWELL	58	17
CAMDEN	12	14
CARTERET	37	23
CASWELL	12	3
CATAWBA	46	6
HICKORY	19	10
NEWTON-CONOVER	11	6
CHATHAM	25	8
CHEROKEE	9	11
EDENTON-CHOWAN	20	19
CLAY	5	2
CLEVELAND	47	5
KINGS MOUNTAIN	16	17
SHELBY	20	19

E-2

LEA	MEDIA CENTER HOLDINGS	VOCATIONAL HOLDINGS
COLUMBUS	8	5
WHITEVILLE	5	9
CRAVEN	49	14
NEW BERN		
CUMBERLAND	98	52
FAYETTEVILLE	50	6
CURRITUCK	24	13
DARE	14	10
DAVIDSON	94	26
LEXINGTON	12	8
THOMASVILLE	13	
DAVIE	16	8
DUPLIN	56	24
DURHAM	104	6
DURHAM	15	3
EDGECOMBE	13	1
TARBORO	26	0
WINSTON-SALEM/FORSYTH	194	28
FRANKLIN	43	15
FRANKLINTON	3	8
GASTON	69	47
GATES	11	9
GRAHAM	4	6
GRANVILLE	13	4
GREENE	32	14
GUILFORD	93	101
GREENSBORO	81	39
HIGH POINT	44	16
HALIFAX	5	4
ROANOKE RAPIDS	11	2
WELDON	12	2
HARNETT	17	21
HAYWOOD	34	7

LEA	MEDIA CENTER HOLDINGS	VOCATIONAL HOLDINGS
HENDERSON	31	16
HENDERSONVILLE	3	6
HERTFORD	9	10
HOKE	11	15
HYDE	14	3
IREDELL	16	6
MOORESVILLE	7	8
STATESVILLE	6	2
JACKSON	45	9
JOHNSTON	21	26
JONES	16	11
SANFORD-LEE	43	9
LENOIR	22	22
KINSTON	11	20
LINCOLN	18	22
MACON	66	22
MADISON	13	15
MARTIN	19	12
MCDOWELL	40	2
CHARLOTTE/MECKLENBURG	227	119
MITCHELL	6	9
MONTGOMERY	19	8
MOORE	36	56
NASH	28	5
ROCKY MOUNT	24	5
NEW HANOVER	94	30
NORTHAMPTON	10	12
ONSLOW	100	38
ORANGE	27	4
CHAPEL-HILL/CARRBORO	55	19
PAMLICO	10	13
ELIZABETH CITY-PASQUOTANK	33	40
PENDER	15	0
PERQUIMANS	10	10
PERSON	58	33

E-4

LEA	MEDIA CENTER HOLDINGS	VOCATIONAL HOLDINGS
PITT	36	30
GREENVILLE	47	31
POLK	6	1
TRYON	12	31
RANDOLPH	36	15
ASHEBORO	13	21
RICHMOND	23	20
ROBESON	10	19
FAIRMONT	7	13
LUMBERTON	11	30
MAXTON		
RED SPRINGS	23	1
SAINT PAULS	14	35
ROCKINGHAM	12	13
EDEN	13	Not Reporting
MADISON-MAYODAN	30	7
REIDSVILLE	12	4
ROWAN	72	77
SALISBURY	22	4
RUTHERFORD	45	7
SAMPSON	26	10
CLINTON	12	6
SCOTLAND	49	21
STANLY	32	37
ALBEMARLE	15	10
STOKES	20	21
SURRY	53	6
ELKIN	21	5
MOUNT AIRY	36	12
SWAIN	16	4
TRANSYLVANIA	46	15
TYRRELL	6	6
UNION	47	9
MONROE	38	20

LEA	MEDIA CENTER HOLDINGS	VOCATIONAL HOLDINGS
VANCE	9	5
WAKE	218	285
RALEIGH		
WARREN	4	30
WASHINGTON	1	1
WATAUGA	13	8
WAYNE	54	21
GOLDSBORO	9	
WILKES	13	12
N. WILKESBORO		
WILSON	93	10
ELM CITY		
WILSON		
YADKIN	34	8
YANCEY	5	12
TOTALS:	4,612	2,488

Educational Media and Technology Services
Department of Public Instruction
January, 1983

APPENDIX F

STATE PLAN FOR COMPUTER UTILIZATION IN NORTH CAROLINA PUBLIC SCHOOLS

This paper is designed to establish a philosophical base for the acquisition and utilization of computers for both administrative and instructional purposes in the schools of North Carolina.

As an educational institution, the school has a set of unique needs with regard to computers. Administrators need ready access to information to improve the quality of administrative decision-making and to assist in the performance of routine tasks. Teachers need the assistance that computers offer in student record-keeping and other tasks not directly related to instruction which can free them to work more directly with students. Students need computer literacy skills, in addition to basic skills in reading, writing and mathematics, if they are to function effectively in the world for which they are preparing. It is also important for schools to provide students with career skills in the use of computers, to advise students about career opportunities, and to assist students in using computers to develop skills in analytical thinking and problem solving.

The microcomputer, as we know it today, has only been on the market since 1977, but it has changed the whole nature of thinking about computers as far as schools are concerned. Unlike the mainframe computer, its cost is low and steadily declining as new technologies increase its capacity while decreasing its size. A microcomputer is portable, uses a small amount of space, and is flexible in its possible uses. The amount of memory a microcomputer now has, or can add to its basic repertoire, exceeds the storage capacity of the giant mainframe computers that once filled entire rooms. So it is understandable why the microcomputer has been hailed as the most promising educational tool of the century.

INSTRUCTIONAL APPLICATIONS

Within the very near future, microcomputers will be commonplace appliances in homes, in schools and in the marketplace. In the school's instructional program, the micro will be used primarily as a tool which has tremendous potential for making competent, knowledgeable teachers even more effective.

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In computer-assisted instruction (CAI), the computer has the ability to (1) individualize the instructional process, (2) simulate experiences not possible without a computer, and (3) provide immediate and systematized reinforcement.

Because microcomputers are self-contained units, they are subject to the control of the classroom teacher, and of the student, and may be used to enhance, enrich, and/or extend the instructional program. The computer is a powerful tool they will use to gather, organize, analyze, process and evaluate information. Students of today are growing up with computers, and they view computerization as providing a myriad of occupations, varied opportunities for easing personal responsibilities, and multiple recreational facilities. Thus, computer literacy must become a basic skill for them as well as for educators.

The term "Computer Literacy" has been severely overworked. Being computer literate does not necessarily mean understanding all of the complex workings of the machine and its related components. Rather, it means knowing how to use a computer for personal applications and how to recognize other potential uses for the machine.

Computer literacy programs will vary from school system to school system but the following elements should be included:

...activities to overcome negative attitudes or fears

...definitions of computer terms

...familiarity with basic components of a microcomputer

...what a computer and computer programs can and cannot do

...an introduction to computer programming

...sources of information about computers and computer software

...impact of computers on society

While many of the elements of a computer literacy program can be taught without access to a microcomputer, hands-on activities increase learner outcomes.

ADMINISTRATIVE APPLICATIONS

The potential uses of computers for administrative purposes can be grouped into three broad categories. The first category is described as traditional business data processing similar to that which exists in most large business

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and commercial concerns. The second category is the management aspect of the instructional program including student data that has been traditionally collected and maintained by individual teachers as well as guidance counselors and other support personnel. The third category is the networking capability that can link individual schools to the system-level computer in addition to computers in other schools and agencies for information exchange and compilation of data. A major concern in all applications must be the preservation of privacy for those who provide, or are the subject of, the information.

The administrative use of computers in school districts and regions will improve the utilization of information which is currently compiled and distributed by less efficient means. Computer users will also create new administrative applications, many of which are difficult to anticipate. Some current applications that look promising for administrators include electronic mail, electronic conferencing, the electronic bulletin board, and the exchange and compilation of statistical data.

One of the impediments to the effective use of computers in schools is the tradition which surrounds many of the current manual practices. If computers are to have a positive impact on education, administrators must develop and implement administrative applications which are cost effective, time-saving, and convincing demonstrations of computer benefits to all interested groups.

RECOMMENDATIONS

To help schools implement microcomputers into their on-going programs for both administrative and instructional purposes, the following recommendations are offered. It is recommended:

(1) that before any hardware or software is acquired, that schools and school systems first develop an overall plan with input from all possible users as to short and long-range goals to be achieved.

(2) That schools and school systems establish a committee composed of teachers, media coordinators, administrators and other appropriate staff and community individuals to coordinate, promote and support the implementation of their plan.

(3) that, for instructional purposes, schools and school systems:
...support the use of the microcomputer as an instructional tool to be used in all content areas, at all grade levels, and by all instructional and support personnel.

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...provide all students the opportunity to become familiar with the operation of a computer, to develop an awareness of the extensive use of computers in the world around them, and to acquire an understanding of the capabilities and limitations of computers.

...provide an integrated sequence of studies which incorporates computer awareness (K-5), computer exploration (6-9), and computer specialization (10-12) as students progress toward computer literacy.

...develop a cadre of qualified teaching personnel competent in computer operations, software evaluation and selection, integration of computer software into instructional program, and simple computer programming.

...and that each teacher be charged with the responsibility for appropriate use of microcomputer hardware and software and the integration of both into his/her existing classroom instructional program in accordance with the school and school system's plan.

(4) that, for administrative purposes, schools and school systems:

...require administrators to gain at least a minimal understanding of both the instructional and administrative uses of computers to enable them to make informed decisions, cope with problems and provide leadership in this new area of technology.

...establish guidelines for administrative uses of the microcomputer within the school system that will comply with state, regional and federal needs and requirements.

...coordinate the various administrative uses of computers within the school system in order to establish networks for data access and transfer.

(5) that teacher training institutions:

...develop and implement a plan that ensures that all future teachers, administrators, and other educators are computer literate.

...provide staff development opportunities designed for current educators to acquire needed skills in using the computer both as an instructional and management tool.

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(6) that the Department of Public Instruction continue to provide leadership and seek to expand services to schools and school systems in the planning for and implementation of microcomputers in the instructional process and for administrative uses.

An Instructional Program Design Model

This sample curriculum design incorporates the developmental sequences of computer awareness, exploration, and specialization. Although grade level designations are suggested, the indicated sequence should be followed regardless of the level at which the use of microcomputers begins.

Computer Awareness (Grades K-5)

Objectives:

1. The student can describe the computer as a problem-solving machine.
2. The student can recognize and be familiar with computer words and computer parts -- their meaning and uses.
3. The student can identify the capability and limitations of computers and daily uses of computers.
4. The student can load and run programs.
5. The student can recognize several early computing devices and compare each to modern computers.
6. The student can use introductory commands of a computer language to create and control computer shapes or a program output.

Activities Involving:

1. Computer-assisted instruction utilizing programs written in the instructional modes of:
   A. simulations,
   B. drill and practice,
   C. tutorials.
2. Vocabulary and function for computer hardware and operation.
3. Introductory programming in LOGO or BASIC.
4. Examples of historical development of and societal uses of computers.

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Implementation:

1. Computer-assisted instruction as part of all curriculum areas.
2. General societal information (historical development and applications) as part of all curricular areas.
3. Programming: Introductory for all students with extended opportunities depending on student interest and ability.

Computer Exploration (Grades 6-9)

Objectives:

1. The student can identify the three types (mainframe, mini, micro) of computers and describe the advantages of each.
2. The student can list computer and computer-using jobs and understand the job description and training for each.
3. The student can trace the historical development of computers and resulting societal effects.
4. The student can identify the common programming languages and their applications.
5. The student can operate a microcomputer: on-off sequences; program loading, saving and copying; and program output to a printer.
6. The students can modify and successfully run instructional programs for problem-solving applications.

Activities Involving:

1. Computer-assisted instruction utilizing programs written in the instructional modes of:
   A. simulations,
   B. drill and practice,
   C. tutorials,
   D. problem solving.
2. Computer hardware and software terminology, function and operation.

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3. Complete historical development of computers; the hardware, capability of that hardware, and the people responsible for the development.
4. Study of occupations directly and indirectly involving computers, the activities involved in all directly-related jobs, and the training necessary to obtain such jobs.
5. Exploration of the applications within and effect on society of computers, particularly the microprocessor.
6. Awareness of the capabilities and limitations of computers.
7. Computer programming, using a language such as LOGO or BASIC and including:
   A. fundamental programming ideas,
   B. problem-solving program design activities,
   C. graphics,
   D. design of simple computer-assisted instructional programs.

Implementation:

1. Computer-assisted instruction as part of all curriculum areas.
2. Computer literacy unit (or semester course) that includes more programming as part of or as an elective.
3. Short awareness unit (exposure) for all students with opportunities for hands-on follow-up activities.

Computer Specialization (Grades 10-12)

Objectives:

1. The student can select and appropriately use programs to enrich and extend the regular course instruction.
2. The student can determine content topics appropriate for computer applications.
3. The student can modify and successfully run computer programs.
4. The student can use the microcomputer to gather, organize, analyze, process and evaluate information.

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Activities Involving:

1. Computer-assisted instruction utilizing programs written in the instructional modes of:
   A. simulations,
   B. drill and practice,
   C. tutorials,
   D. problem solving.
2. Overview of computer development and applications appropriate to particular curriculum areas (e.g. business, math, science and others).
3. Computer programming and data processing techniques.

Implementation:

1. Computer-assisted instruction as part of all curriculum areas.
2. "Introduction to Computers" semester course especially for business students and for math-science oriented students.
3. Programming and data processing courses especially for business students and for math-science oriented students.

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An Administrative Model

This suggested administrative model describes some possible areas of use of microcomputers at the school system as well as the school building level, including some concurrent uses. This model may be useful in designing a coordinated system-wide plan.

Possible Applicztions at the Central Office

- Financial Records and Purchasing
- Maintenance Services
- Certification/Personnel Data Base
- Staff Development
- Professional Materials Inventory and Circulation
- Word Processing/Mail Lists

Possible Concurrent Uses

- Child Nutrition
- Attendance
- Textbooks
- Substitute Teacher Data Base
- Community Schools Program

Possible Applications at the Building Level

- Scheduling
- Student Data Base
- Building Inventory
- Media Inventory and Circulation Systems
- Diagnostic and Prescriptive Programs
- Word Processing/Mail Lists
- Classroom Management
- Report Cards

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SUMMARY

Computers have come to school! It is clear that this technological innovation has a significant role in education, both for the instructional program and the administration of the school. This document defines the phenomena, emphasizes the importance of planning, makes recommendations, and outlines a curriculum design as well as an administrative model.

As the development and use of microcomputers progresses, the State Department of Public Instruction will continue to provide leadership for assisting local systems with implementation strategies. Many examples of that leadership are evident already. Among them are the assistance provided through utilization workshops, hardware contracts, a hardware/software laboratory for evaluating materials and equipment, the development of staff development programs via open-air broadcast, and the technical consultant services both within the Agency and to local school systems.

Areas of effective utilization are constantly changing as appropriate hardware and software evolve. As the Department's curriculum study committees revise subject area curriculum guides to include additional competencies and skills, they will integrate the use of the computer into instruction in those areas. It is important that all areas know and use the tool in instruction and are aware of administrative and management possibilities.

Three elements need immediate attention. Resources for implementation must continue to be identified from existing as well as new funds as they become available. It is vital to strengthen the coordination of efforts of public schools, community and technical colleges, and colleges and universities in the use of computers in and for schools. Computers, while not a panacea to cure all ills, can be sound educational tools.

Moreover it is essential that all groups involved in the educational process be aware and informed of progress being made. Dialogue and communication networks must be developed and/or refined among educators, business and industry, and the general public.

Based on good judgment, there must be a concerted effort by the Department of Public Instruction, by school systems, and by affected groups to make this new technology available, relevant, useful, and effective for learning.

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North Carolina Department of Education
Microcomputer Activities

State Plan for Computer Utilization in North Carolina Public Schools

In January of 1983, the North Carolina Department of Education published, and distributed to all schools and administrative units, a plan for the acquisition and utilization of microcomputers both for the instructional program and the administration of the school. This document defines the phenomena of computers, emphasizes the importance of planning, makes recommendations, and outlines a curriculum design as well as an administrative model. Using this document as a guide, all school systems have been asked to develop a system-wide plan for computer utilization in their respective schools and to file a copy of their approved plan with the Department of Public Instruction.

Microcomputer Guidelines Notebook

Each school system has been given a Guidelines and Procedures for Microcomputer Acquisition and Implementation notebook, with updates provided periodically. The guidelines notebook contains definitions, descriptions of possible educational uses, a copy of the current microcomputer contract and back issues of the microcomputer newsletter.

State Contract for Purchasing Microcomputers

The third annual state contract for microcomputers was awarded on April 15, 1983 to five microcomputer vendors: Apple Computer, Inc. (Apple IIe, Apple III); Radio Shack/Tandy Co. (Model III, Color Computer, Models II, 12, 16); Stones Southern School Supply (Texas Instruments 99/4A); Atari, Inc. (Atari 800 and 1200 XL); and Pascal and Associates (Franklin Ace 1000 and 1200). School systems may purchase computers and peripherals at a substantial discount from this contract. The contract establishes minimum standards for vendor support, such as a mandatory one-hour setup time for a micro system, as well as support for State Agency activities.

Microcomputer Newsletter

A newsletter, the Micro Monitor, is published and distributed four times per year to every school in North Carolina, to system level administrators, and to several hundred other interested educators. The newsletter highlights school system activities across the state and reports items of general interest on hardware, staff development activities, software, and resource materials. Educators are encouraged to submit articles.

Computer Courseware Evaluation

Evaluating microcomputer courseware before purchase is vitally important due to the poor quality of many programs being marketed. The Division of Media Evaluation Services coordinates a program wherein DPI consultants preview courseware in all subject areas. The staff distributes to schools annotated bibliographies, the Advisory Lists of Instructional Media, which contain critiques of noteworthy titles deemed most appropriate for use in Grades K-12. The Media Evaluation Center displays hundreds of microcomputer programs for examination by educators who visit the Center to select courseware and/or hardware.

Microcomputer Lab

A microcomputer lab established in the Media Evaluation Center contains micros on state contract and makes them accessible to DPI and LEA personnel. Educators may examine firsthand various equipment configurations before purchasing hardware for their schools and may use the micros to review courseware available in the Center. The Center's staff demonstrates the use of micros for visitors in the lab and transports the machines to workshops conducted for educators throughout the state.

Human Resource Database

The Division of Media Evaluation Services is gathering information to develop a database of resource people and of colleges and universities providing computer-related services and/or training which educators may utilize. The database will provide ready access to information on individuals and institutions who offer assistance to school personnel and others using microcomputers and courseware in an educational setting.

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"Ready or Not" TV Series

Staff members in Educational Media and Technology Services have written and produced a series of staff development television programs focusing on planning for microcomputers, the review and evaluation of microcomputer software, and the educative use of online services. The series and accompanying teacher's guide was offered in part during the 1982-83 school year. In addition two television series dealing with computer awareness for teachers and secondary students have been acquired and distributed--FAST FORWARD produced by the CBC and THE COMPUTER PROGRAMME by the BBC.

Electronic Reference Services

Education Information Services provides professional library reference and information services to Agency staff. It utilizes all the electronic capabilities available to ensure that staff members have current, useful information for their daily work.

The library subscribes to BRS, an online research service for educators with one million documents in fifteen education-related databases. The electronic mail section of BRS allows access to members in 41 other states as well as our own.

The current awareness service, which alerts educators to journal articles and books of special interest to them, is now being computerized to save staff preparation and delivery time and create an in-house database of pertinent information.

EIS offers multi-media presentations for Agency staff to acquaint them with computers and their use and impact.

Microcomputer Workshops for Principals

During the past year, the Educational Media and Technology Services staff has coordinated five microcomputer workshops (three basic and two advanced) for school administrators under the sponsorship of the Principals Institute. The three basic workshops were designed to introduce administrators to the potential educational uses of a microcomputer; while the advanced workshops focused more on the selection of hardware, peripherals, and on demonstrations of successful administrative programs currently in use in various schools of the state. Approximately three hundred administrators received extensive training during these two and one-half day workshops.

For further information, please contact:

Educational Media and Technology Services,
Room 250, Education Building, Raleigh,
North Carolina 27611

(919) 733-3193

Business Education Applications

Approximately 900 business teachers have been trained in the use of microcomputers in business education since July of 1981. Course guides have been developed and distributed for Introduction to Computers, Business Data Processing I and II, Computerized Accounting Occupations, and Secretarial/Word Processing. Approximately 1500 microcomputers are being used in business classes to teach accounting, word processing, data processing and computer literacy courses.

Project SLATE

North Carolina's Department of Public Instruction has been selected to participate in Project SLATE (State Leadership Assistance for Technology in Education) during the 1983-84 school year. Project SLATE, funded by the U.S. Department of Education, is designed to provide free technical resources and assistance to State Education Agencies in setting standards and priorities for electronic learning technology. A special feature of the project will be a subscription to SPECIALNET, an electronic mail system, for access to planning resources and interaction with other education policy makers nationally.

Minnesota Educational Computing Consortium (MECC)

The North Carolina School of Science and Mathematics joined MECC as an institutional member, thereby acquiring the rights to provide membership subscriptions to North Carolina schools. The Department of Public Instruction has obtained a membership in order to have the MECC software available at the Media Evaluation Services Center for educators to review. Plans exist to distribute copies of the MECC software to the eight regional centers for staff development purposes.

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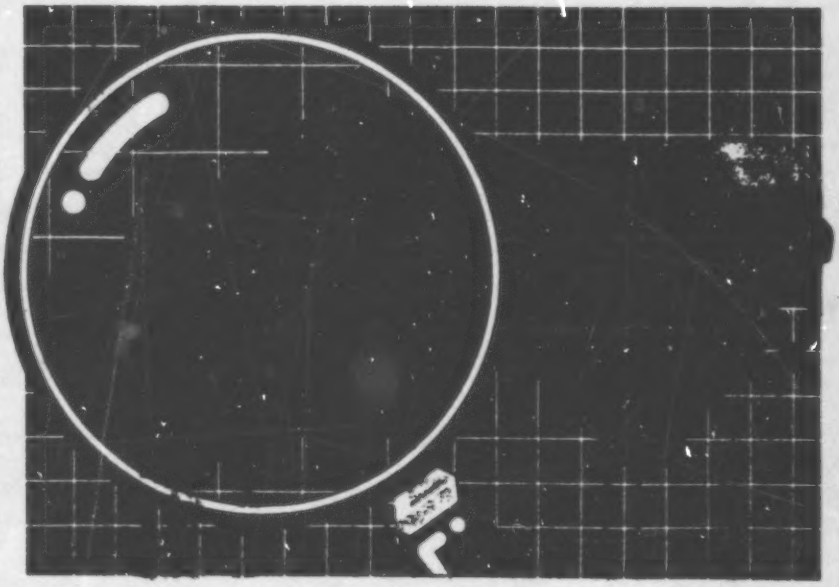
STATES TO WATCH

NORTH CAROLINA: A SOFTWARE EVALUATION PLAN WITH NATIONAL IMPLICATIONS

When North Carolina reviews instructional software... other states listen.

BY CHERYL L. MEAD



NORTH CAROLINA IS certainly making a name for itself these days. In a feature article published last March, *The New York Times Magazine* called it "probably the most vibrant and diverse state in the Southeast." The state's high technology industry initiatives have been so successful that some Tarheel State natives have dubbed the booming Research Triangle Park "Silicon Valley East." North Carolina's success in attracting high technology investment has not been lost on leaders in other states, either—as is being attested by their recent attempts to mount similar programs.

Technology has come to the North Carolina State Department of Public Instruction as well, and "vibrant" aptly sums up that organization's attitude towards and involvement in the field. The most visible sign of all of this interest, probably, is the extension of the department's long established (and highly regarded) Media Evaluation Services program to encompass computer hardware and software. The MES program, which has been providing North Carolina educators with critical information about textbooks and video material for nearly two decades, now provides the same service for computer-using educators through two avenues: a central MES computer center providing in-service and the opportunity to preview software; and the massive *Advisory Lists*, a compilation of programs recommended by MES-selected experts. Both projects have thrived—so much so, in fact, that the number of other state education departments that have sent staffers to look over the North Carolina projects has now reached 17, and seems destined to climb even higher this year.

THE MES CENTER

The MES Center, a fully equipped computer lab with an extensive array of educational software, is located in Raleigh, the state capital, and is the focal point for many of the department's educational technology activities. Its most important offerings, probably, are the regular in-service workshops for teachers and administrators and the opportunities to preview so much instructional software. Arrangements have been made to extend these offerings to educators in other parts of the state, through department-sponsored bus service and regional workshops.

> NORTH CAROLINA APPEARS TO HAVE BEEN ABLE TO ACCOMPLISH EVERYTHING IT HAS SET OUT TO DO IN THE FIELD OF EDUCATIONAL TECHNOLOGY.

Department staffers at the Center are also helping to develop a range of other services for computer-using educators, including two on-line data bases; hardware evaluation; bibliographies of books and journals related to the field; and a variety of publications describing model projects in instructional computing. (Editor's Note: *For a synopsis of one such publication, designed to help school librarians catalog computer software, see page 40.*)

THE ADVISORY LISTS

The MES service that has probably attracted the most attention from other state education authorities, however, is *The Advisory Lists of Computer Courseware*. The *Lists* provide North Carolina educators with an exhaustive compendium of currently available educational software programs that have been previewed and recommended by MES specialists. Editor Barbara Bland and her staff of nine consultants, all of whom are

(Continued on page 39)

Cheryl Mead is a freelance writer living in New York City.

Illustration by Little Apple Art ©1983

CIRCLE 17 ON READER SERVICE CARD

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STATES TO WATCH

(Continued from page 32)

content specialists with at least three years of teaching experience, have at last count reviewed nearly 700 courseware packages, spanning all subjects and grade levels K–12. And since the constant updating, printing, and redistribution of the reviews is becoming rather costly and time-consuming, plans are underway to put the *Advisory Lists* on-line.

The process of reviewing courseware is based on the department's own Data Base Management Software Evaluating forms—criteria listings that provide the critiques with the framework that this kind of comparative reviewing requires. Unfortunately, because of space restrictions, reviews must be limited to one (lengthy) paragraph each, and only those programs that can be recommended for purchase are included. Negative reviews are, however, kept on file for any teacher who may wish to inquire about any unlisted programs.

MES CONSULTANTS... HAVE AT LAST COUNT REVIEWED NEARLY 700 COURSEWARE PACKAGES, SPANNING ALL SUBJECTS AND GUIDE LEVELS K-12.

The importance of MES's *Advisory Lists* extends beyond its usefulness as a catalogue. Courseware developers are often hesitant to allow individual schools and teachers access to their products for fear that they will copy them illegally. MES, in the relatively short time that it has been evaluating courseware, has built enough of a reputation that it is now able to choose its programs for review from the entire range of educational software now appearing on the market. Indeed, many software producers consider it in their best interests to send their products to North Carolina, as several other states already refer to the *Advisory Lists* in making software purchasing decisions, and there is talk now about making the publication available commercially. More than once, MES personnel say, producers have revised their courseware according to the findings of the MES consultants alone.

GOING NATIONWIDE

In addition to borrowing North Carolina's *Advisory Lists*, a number of states have expressed interest in forming their own programs based on the MES system. This development is regarded with satisfaction by department staffers—but with some skepticism, too. "What would be more valuable," says Assistant State Superintendent of Educational Media and Technology Elsie Brumback, "would be if these states would each take a specific content area, such as science or mathematics, and preview all courseware pertaining to the area." Rather than each state trying to put out its own comprehensive guide, she continues, states should pool their resources and work together. The process of software previewing could thus be expanded into regional—even national—networks without any duplication of effort.

Big plans. But so far, at least, North Carolina appears to have been able to accomplish most everything it has set out to do in the field of educational technology. Followed carefully, these trail-blazing "tarheel" footsteps might well lead someday to the development of a forceful, national educator voice in the wilderness of educational technology.

(continued)

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For the Librarian:
HOW TO CATALOG COMPUTER COURSEWARE

NORTH CAROLINA HAS DEVELoped an efficient courseware cataloging process, using a library system that is familiar to all librarians—the Dewey Decimal Classification and Relative Index—and the likewise tried-and-trusted *Sears List of Subject Headings*. You can easily establish an effective courseware library system in your school by following the guidelines set out below.

FINDING THE CALL NUMBER

The first step in cataloging a courseware program is to assign it a call number.

- Refer to the Dewey Decimal Index, and choose the appropriate classification number according to the subject matter. For example, the mathematics classification number would be 510.
- Place the word "courseware" above the classification number.
- Place the first letter of the first word in the title below the Dewey number. Ignore any definite or indefinite articles starting the title, like "The," "A," and "An." Thus, the call number for a mathematics program called The Adding Game would be:

  Courseware
  510
  A

If a program contains a variety of subjects, catalog it under the subject area which is represented most or where you think it will receive the greatest attention.

SETTING UP THE CATALOG CARD

Main Entry Cards. The call number is entered in the upper left corner of the card catalog. The rest of the information is placed in the center of the card in the following order:

- Bibliographic information containing the title, producer and copyright, all of which can be found on the software label.
- Collation information that might be useful to someone running the program. If, for instance, it is a diskette, cite all the information about it, e.g., one 5¼" diskette. Add 3.2 or 3.3 DOS, if the diskette is for the Apple. Also include information about accompanying guides and worksheets, etc.
- A program synopsis. This is a concise description of what the program offers, e.g., spelling practice exercises designed to strengthen spelling skills, grade levels.
- A list of compatible equipment and the exact requirements necessary for the program to run, e.g., TI 99/4A console, monitor, speech synthesizer, disk controller, disk drive, terminal emulator.

Additional entries are important in order to make your library system as efficient as possible. The cataloging procedure you might follow is very much the same when you are making out these kinds of cards:

Subject Cards are arranged in the same way as the Main Entry card, except that they begin with the subject heading found in the Sears List. (Use the *Sears List* to determine your subject headings whenever possible. If *Sears* doesn't have the relevant heading, feel free to create your own heading as long as you record it in the office copy of *Sears*.)

Shelf List Cards are also set up in the same manner as the Main Entry card, although you may choose to delete the synopsis and/or equipment information to give you room for other information, e.g., the source of funds used to purchase the program.

Content Note Cards are used when a diskette, cassette or module contains more than one program. These cards should list the titles of the various programs included.

Title Analytic Cards are designed to identify individual programs on a diskette that contains more than one program. These cards should be set up in the same way as the Main Entry cards.

Series Entry Cards are necessary when several diskettes are in the same series. These too are arranged like the Main Entry cards, citing the series title as well as the individual program title.

PROCESSING COURSEWARE

It will be necessary for you to put identification labels on all of your software. It is best to use thin paper press-on labels so that they won't affect the operation of the software. You will need to make out two labels for each catalog entry: one to record the call number, and the other for the title, producer and copyright.

DOCUMENTATION

Mark guides, manuals and other printed materials in the same way as you would a library book or pamphlet. Affix a call number label on each one and place all the documentation in the container with the diskette, cassette or module.

CONTAINERS AND PACKAGING

The way in which you shelve your computer courseware could have a significant effect on how much it is used. If, for example, you shelve a series of eight or ten diskettes with only a single guide, you are likely to be limiting its use. You should make every effort to get hold of additional copies of the program's documentation when you are buying several diskettes, cassettes, or modules in a series.

Make sure that you fix call number labels on all of the software containers. If you need to implement a check-out system, attach a pocket with a circulation card to the courseware containers also.

Finally, write up and post a set of rules guiding both the care of your diskettes and the particulars of your library lending policy. Hopefully, all of your students (and all of your librarians!) will soon be searching for, checking out, and using your library's complement of computer software as quickly and as easily as they handle books, records, and magazines right now. ■

A SAMPLE "MAIN ENTRY" CATALOG CARD

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COST ESTIMATE FOR PHASE-IN OVER THREE YEARS

Facts: - 1982-1983 First Month Average Daily Membership: 1,084,771
- 2014 schools
- 60,000 teaching personnel

Assumed: 1 microcomputer for every 50 students

	Item	Total Cost	Cost Per Year 1983 - 86
1.	Hardware (20,000 computers @ $1,000 per system)	$20,000,000	$6,700,000
2.	Courseware ($300 per school)	$ 604,200	$ 201,400
3.	Maintenance (1% of annual hardware costs)	$ 200,000	$ 67,000
4.	Staff Development ($100 per teaching personnel)	$ 6,000,000	$2,000,000
		$26,804,200	$8,968,400

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COST ESTIMATE FOR PHASE-IN BY GRADE LEVELS

Facts: - 1982-1983 First Month Average Daily Membership: 1,084,771
Grades 9-12: 328,060
Grades 4-8: 442,806
Grades K-3: 313,905

- 2014 schools

- 60,000 teaching personnel

Assumed: 1 microcomputer for every 50 students

Phase-In: Item	Year 1 Grades 9-12	Year 2 Grades 4-8	Year 3 Grades K-3	Total Expenditure
1. Hardware (@ $1000 per system)	$6,561,200	$ 8,856,120	$6,278,100	$21,695,420
2. Courseware ($300 per school, 1/3 of schools per year)	$ 201,400	$ 201,400	$ 201,400	$ 604,200
3. Maintenance (1% of annual hardware costs)	$ 65,612	$ 88,561	$ 62,781	$ 216,954
4. Staff Development ($100 per teaching personnel, 1/3 of total number per year)	$2,000,000	$ 2,000,000	$2,000,000	$ 6,000,000
Total Expenditure:	$8,828,212	$11,146,081	$8,542,281	$28,516,574

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Table 1

Computer Occupational Curriculums*

Curriculum	Occupation	No.of Programs	1982-83 Enrollment
Computer Engineering (T-040)	Electronics Mechanic (Computer, Systems)	1	289
Digital Electronic Equipment Repair (V-113)	Electronic Computer Mechanic	1	121
Basic Computer Programming (T-169)	Programmer	1	190
Computer Operations (V-012)	Computer Operator	5	949
Data Entry Operations (V-129)	Data Entry Operator/Typist	1	-
Business Computer Programming (T-022)	Business Programmer	40	13,767

* Several colleges were approved to offer these programs in 1983-84.

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Table 2

Examples of Curriculums Using the Computer as a Tool or Using Computerized Machinery

Curriculum	Computer Application	No. of Programs	1982-83 Enrollment
Accounting (T-016)	Problem Solving	41	4,808
Agricultural Science (T-017, T-126)	Planning, Cost Analysis	20	279
Architectural (T-021, V-015)	Computer-Aided Design (CAD)	9	739
Civil Engineering (T-038)	CAD	8	545
Commercial Art/Design (T-070)	Graphics Design	10	2,838
Commercial Graphics (T-068)	Graphics Design	3	155
Drafting/Design - Mechanical (T-043, V-017)	CAD	34	1,918
Electrical Engineering (T-044)	Calculations, Monitoring, Computer Control	7	315
Electromechanical (T-039)	Calculations, Monitoring, Computer Control	3	116
Electronics Engineering (T-045)	Calculations, Monitoring, Computer Control	37	4,718
Electrical Installation/ Maintenance (V-018)	Computer Control Systems, Repair	39	1,665
Foodservice (T-074, V-053)	Budgeting, Management, Menus	16	1,002
Graphic Arts - Printing Management (T-026, V-022)	Prototype Setting	6	275
Industrial Electronics (V-045)	Computer Control Systems	4	126
Industrial Engineering (T-047)	Information Systems Mgt., Control Systems	7	471
Instrumentation (T-048)	Monitoring Systems, Computer Control	8	212

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Table 1

Continuing Education

Selected Computer Course Data

Course	Number of Classes			No. of Students Enrolled		
	1982-83	1981-82	1980-81	1982-83	1981-82	1980-81
Computer Understanding	265	166	78	4,890	2,835	1,292
Computer Programming	257	106	39	4,968	1,856	716
Keypunch/Data Entry	17	30	28	255	482	384
Word Processing	28	---	--	357	---	---

Table 2

NC Consortium for Instructional Telecommunications

Selected Computer Course Data

Course	Number of Colleges Offering Course	Number of Students Enrolled					
		Wtr/Spr 1983	Fall 1982	Wtr/Spr 1982	Fall 1981	Wtr/Spr 1981	Fall 1980
Making it Count	4						449
	11					744	
	8				709		
	13			745			
	15		923				
	13	888					

NOTE: Telecourse schedule for Fall, 1983 indicated that 9 colleges would be offering "Making it Count."

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Table 2 (continued)

Curriculum	Computer Application	No. of Programs	1982-83 Enrollment
Machinist (T-121, V-032)	Computer Numerical Control	38	2,220
Manufacturing Engineering (T-050)	Planning	6	195
Manufacturing Resources Planning (T-170)	Control Systems Information, Systems Management	1	54
Mechanical Engineering (T-051)	Numerical Control Systems	7	470
Paralegal (T-120)	Word Processing Research	9	913
Respiratory Therapy (T-091)	Diagnostic Testing	7	381
Secretarial Science	Word Processing	56	4,086
Surveying (T-125)	Calculations	6	83
Tool/Die Making (V-048)		8	227

NOTE: Colleges will be implementing hardware and software into other curriculums as funds for equipment are available and appropriate applications software programs are developed. The Prime 2500 minicomputer is being installed in many colleges. Twenty-one systems have been completed. The primary emphasis at this time is administrative applications, with computer languages and word processing applications being available.

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APPLE II E
COMPUTER LABORATORY
20 WORK STATIONS

Hardware

20 Microcomputers @ $1,397 each	$27,940	
Apple II E 1 Disk Drive Monitor II 80-Column Card		
4 Printers @ $600 each	2,400	
Apple Printer Cables/Hook-up Cards		
TOTAL		$30,340

Hook-Up

(No separate charge; part of package)

Furniture

20 Computer Tables (24x36) @ $89 each	$1,780	
4 Printer Tables @ $155 each	620	
20 Chairs @ $30 each	600	
TOTAL		3,000

Software

Apple Presents Apple Program Introduction to Keyboarding Introduction to BASIC (Not for training programmers, but training for how machine logic works) (No separate charge; part of package)		
20 Apple Soft BASIC Tutorial Manuals (Self-instruction) @ $20 each	$400	
Introduction to Word Processing (How to use word processor)	100*	
TOTAL		500

*Software for future use with central system.

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APPLE II E (Continued)

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Training

(No separate charge; part of package)

COSTS WITHOUT WORD PROCESSING	$33,740
COSTS WITH WORD PROCESSING	$33,840

Costs for 58 Colleges

COSTS WITHOUT WORD PROCESSING	*$1,956,920*
COSTS WITH WORD PROCESSING	*$1,962,720*

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FRANKLIN ACE 1000 COMPUTER LABORATORY - 20 WORK STATIONS

Hardware

20 Microcomputers @ $1,299 each	$25,980	
1 Disk Drive Disk Controller Card 80-Column Card 64K RAM for Apple Software Numeric Key Pad Cooling Fan 50-watt Power Supply DOS 2.0 Leading Edge Gorilla Monitor		
4 Printers @ $397 each (Prowriter II Dot Matrix)	1,588	
TOTAL		27,568

Hook-Up

4 Parallel Interface Card with Cable @ $70 each	$280	
TOTAL		280

Furniture

20 Computer Tables (24x36) @ $89 each	$1,780	
4 Printer Tables @ $155 each	620	
20 Chairs @ $30 each	600	
TOTAL		3,000

Software

Apple Soft BASIC
Ace Writer II (word processing software)
AceCalc (spreadsheet)
Turbo Pascal (computer literacy)
Instruction manuals for software/hardware
(No separate charge; part of package)

Training

For each computer system purchased, receive one-hour free training

Additional training @ $60 per hour

TOTAL COSTS $30,848

Costs for 58 Colleges

TOTAL COSTS *$1,789,184*

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FRANKLIN ACE 1200 COMPUTER LABORATORY - 20 WORK STATIONS

Hardware

20 Microcomputers @ $1962 each	$39,240	
2 Disk Drives 80-Column Card Disk Controller Card 64K RAM - Apple/CPM Parallel Interface Serial Interface Numeric Key Pad Cooling Fan 50-watt Power Supply DOS 2.0 CPM Diskette		
20 Leading Edge Gorilla Monitors @ $88 each (12" high resolution green screen)	1,760	
4 Printers @ $397 each (Prowriter II, Dot Matrix)	1,588	
TOTAL		$42,588

Hook-Up

4 Cables to connect printer @ $50 each	$200	
TOTAL		200

Furniture

20 Computer Tables (24x36) @ $89 each	$1,780	
4 Printer Tables @ $155 each	620	
20 Chairs @ $30 each	600	
TOTAL		3,000

Software

Apple Soft BASIC
C BASIC
WordStar (word processing)
MailMerge (form letter generator)
AceCalc (spreadsheet)

(No separate charge; part of package)

Turbo Pascal (option) Diskettes and manuals for programming language	$50	
TOTAL		50

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FRANKLIN ACE 1200 (Continued)

Training

For each computer system purchased, receive one-hour free training

Additional training @ $60 per hour

COSTS WITHOUT PASCAL	$45,788
COSTS WITH PASCAL	46,838

Costs for 58 Colleges

COSTS WITHOUT PASCAL	*$2,655,704*
COSTS WITH PASCAL	*$2,716,604*

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IBM PC COMPUTER LABORATORY - 20 WORK STATIONS*

Hardware

20 Microcomputers @ $1,473	$29,460	
64K 1 Disk Drive Color Graphics Adapter @ $171 each	3,420	
Communications Adapter @ $136 each	2,720	
DOS 2.1 @ $47 each	940	
20 Zenith Monitors (monochrome) @ $110 each	2,200	
		$38,740
5 Compact Printers @ $128 each	640	640
TOTAL		$39,380

Hook-Up

(No separate charge; part of package)

Furniture

20 Computer Tables (24 x 36) @ $89 each	$1,780	
4 Printer Tables @ $155 each	620	
20 Chairs @ $30 each	600	
TOTAL		3,000

Software

HomeWord (Word rocessing)	$ 53	
Introductory		
Computer Discovery	140	
Discovery BASIC	140	
Miscellaneo s	350	
Videotape: Introduction to Personal Computing (Optional)	200	
TOTAL		883

Note: If 20 of each software package and one videotape were purchased, the total cost for software would be $13,660 (20 x $683) plus $200 for a total of $13,860.

*IBM representative recommended that costs be rounded to $45,000 for hardware and $17,000 for software to reflect individual college preferences for hardware or software.

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IBM PC (Continued)

Training

(No separate charge; part of package)

TOTAL COSTS	$43,263

Costs for 58 colleges

TOTAL COSTS	*$2,509,254*

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IBM PC JR COMPUTER LABORATORY - 20 WORK STATIONS*

Hardware

20 Microcomputers @ $927 each		$18,540	
128K			
1 Disk Drive (360KB)			
DOS 2.1 @ $47 each		940	
Basic Cartridge @ $55 each		1,100	
20 Zenith Monitors (monochrome) @ $110 each		2,200	
			$22,780
5 Compact IBM Printers @ $128 each		640	640
	TOTAL		$23,420

Hook-Up

(No separate charge; part of package)

Furniture

20 Computer Tables (24 x 36) @ $89 each		$1,780	
4 Printer Tables @ $155 each		620	
20 Chairs @ $30 each		600	
	TOTAL		3,000

Software

HomeWord (Word processing)		$ 53	
Introductory			
Computer Discovery		140	
Discovery BASIC		140	
Miscellaneous		350	
Videotape: Introduction to Personal Computing (Optional)		200	
	TOTAL		883

Note: If 20 of each software package and one videotape were purchased, the total cost for software would be $13,660 (20 x $683) plus $200 for a total of $13,860.

*IBM representative recommended that costs be rounded to $25,000 for hardware and $17,000 for software to effect individual college preferences for hardware and software configuration.

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IBM PC JR (Continued)

Training

(No separate charge; part of package)

TOTAL COSTS	$27,303

Costs for 58 colleges

TOTAL COSTS	*$1,583,574*

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APPENDIX L

DEPARTMENT OF PUBLIC INSTRUCTION
COST ESTIMATE FOR PHASE-IN BY GRADE LEVELS
APRIL, 1984

Facts: - 1983-84 First Month Average Daily Membership
Grades 7-12: 512,136 ADM
Grades K-6: 573,459 ADM

Total: 1,085,595 ADM

#Schools: 2014
Instructional Personnel: 60,000

Goal: 1 microcomputer for every 50 students (30 minutes per week access time)

Phase-In Item	Year 1 Grades 7-12	Year 2 Grades K-6
1. Hardware (@ $1000 per machine)	$10,242,000	$11,469,000
2. Courseware (@ $300 per school)	299,400	299,400
3. Maintenance (% of hardware cost)	102,420	114,690
4. Staff Development ($100 per staff position)	3,000,000	3,000,000
Total Per Year:	$13,643,820	$14,883,090

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CASE NOTES

[redacted] public intoxication standing alone [redacted] Cooke, 49 N.C. App. 384, 271 [redacted] (1980). is no [redacted] and in order for there Those who [redacted] but not to be a chargeable offense, [redacted] may be assisted but not son must be disruptive in one or mor[redacted] ed. State v. Cooke, 49 N.C. App. 384, 271 ways described in § 14-444[redacted] State v. S.E.2d [redacted])

§§ [redacted] to 14-452: Reserved for future codification purposes.

ARTICLE 60.

Computer-Related Crime.

§ 14-453. Definitions.

As used in this section, unless the context clearly requires otherwise, the following terms have the meanings specified:

(1) "Access" means to approach, instruct, communicate with, cause input, cause output, or otherwise make use of any resources of a computer, computer system or computer network.

(2) "Computer" means an internally programmed, automatic device that performs data processing.

(3) "Computer network" means the interconnection of communication systems with a computer through remote terminals, or a complex consisting of two or more interconnected computers.

(4) "Computer program" means an ordered set of data that are coded instructions or statements that when executed by a computer cause the computer to process data.

(5) "Computer software" means a set of computer programs, procedures and associated documentation concerned with the operation of a computer system.

(6) "Computer system" means a set of related, connected or unconnected computer equipment and devices.

(7) "Financial statement" includes but is not limited to any check, draft, money order, certificate of deposit, letter of credit, bill of exchange, credit card of [or] marketable security, or any electronic data processing representation thereof.

(8) "Property" includes but is not limited to, financial instruments, information, including electronically processed or produced data, and computer software and programs in either machine or human readable form, and any other tangible or intangible item of value.

(9) "Services" includes, but is not limited to, computer time, data processing and storage functions. (1979, c. 831, s. 1.)

Editor's Note. — Session Laws 1979, c. 831, s. 2, makes the act effective Jan. 1, 1980.

§ 14-454. Accessing computers.

(a) A person is guilty of a Class H felony if he willfully, directly or indirectly, accesses or causes to be accessed any computer, computer system, computer network, or any part thereof, for the purpose of:

(1) Devising or executing any scheme or artifice to defraud, unless the object of the scheme or artifice is to obtain educational testing

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material, a false educational testing score, or a false academic or vocational grade, or

(2) Obtaining property or services other than educational testing material, a false educational testing score, or a false academic or vocational grade for himself or another, by means of false or fraudulent pretenses, representations or promises.

(b) Any person who willfully and without authorization, directly or indirectly, accesses or causes to be accessed any computer, computer system, computer network, or any part thereof, for any purpose other than those set forth in subsection (a) above, is guilty of a misdemeanor. (1979, c. 831, s. 1; 1979, 2nd Sess., c. 1316, s. 19.)

Effect of Amendments. — The 1979, 2nd Sess., amendment, effective July 1, 1981, and applicable to offenses committed on or after that date, inserted "Class H" near the beginning of the introductory paragraph in subsection (a). The 1979, 2nd Sess., amendatory act was originally made effective March 1, 1981. It was postponed to April 15, 1981, by Session Laws 1981, c. 63; and to July 1, 1981, by Session Laws 1981, c. 179.

§ 14-455. Damaging computers and related materials.

(a) A person is guilty of a Class H felony if he willfully and without authorization alters, damages or destroys a computer, computer system, computer network, or any part thereof.

(b) A person is guilty of a misdemeanor if he willfully and without authorization alters, damages, or destroys any computer software, program or data residing or existing internal or external to a computer, computer system or computer network. (1979, c. 831, s. 1; 1979, 2nd Sess., c. 1316, s. 20.)

Effect of Amendments. — The 1979, 2nd Sess., amendment, effective July 1, 1981, and applicable to offenses committed on or after that date, inserted "Class H" in subsection (a). The 1979, 2nd Sess., amendatory act was originally made effective March 1, 1981. It was postponed to April 15, 1981, by Session Laws 1981, c. 63; and to July 1, 1981, by Session Laws 1981, c. 179.

§ 14-456. Denial of computer services to an authorized user.

Any person who willfully and without authorization denies or causes the denial of computer system services to an authorized user of such computer system services, is guilty of a misdemeanor. (1979, c. 831, s. 1.)

§ 14-457. Extortion.

Any person who verbally or by a written or printed communication, maliciously threatens to commit an act described in G.S. 14-455 with the intent to extort money or any pecuniary advantage, or with the intent to compel any person to do or refrain from doing any act against his will, is guilty of a Class H felony. (1979, c. 831, s. 1; 1979, 2nd Sess., c. 1316, s. 21.)

Effect of Amendments. — The 1979, 2nd Sess., amendment, effective July 1, 1981, and applicable to offenses committed on or after that date, inserted "Class H" near the end of the section. The 1979, 2nd Sess., amendatory act was originally made effective March 1, 1981. It was postponed to April 15, 1981, by Session Laws 1981, ch. 63; and to July 1, 1981, by Session Laws 1981, c. 179.

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